PATENT

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Aug. 18, 2006
Date

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	: 10/678,603	Confirmation No.	: 6147
Applicants	: Eric B. Cummings et al.		
Filed	: October 3, 2003	Attorney Docket No.:	33531/US
Art Unit	: 1753	Customer No.	: 27,076
Examiner	: Anthony D. Fick		
Title	: DIELECTROPHORESIS DEVICE AND METHOD HAVING INSULATING RIDGES FOR MANIPULATING PARTICLES		

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Commissioner for Patents
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Alexandria, VA 22313-1450

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Sir:

Applicants request review of the final rejection, dated June 15, 2006, in the above-identified application. No amendments are being filed with this request. This request is being filed with a Notice of Appeal.

This review is requested because the Applicants believe that the Examiner has not set forth a case of anticipation under 35 U.S.C. § 102(e). The Examiner has not established that the cited references teach or suggest all claim limitations. As discussed in more detail below, the cited references do not disclose passing a sample fluid across an insulating ridge and transporting particles along the ridge.

In the Office Action dated June 15, 2006, the Examiner (1) rejected claims 1-4, 6-8, 10-12, 17-21 and 23-25 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,875,329 to Washizu et al. ("Washizu"); and (2) rejected claims 1, 5, 7, 9-10, 13-16, 19, 22 and 26 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,749,736 to Fuhr et al. ("Fuhr"). Only claim 19 is listed below in the interest of conciseness.

19. (Previously Presented) A method for manipulating particles using dielectrophoresis, the method comprising:

generating a spatially non-uniform electric field across an insulating ridge;

passing a sample fluid containing the particles across the insulating ridge, the spatially non-uniform electric field exerting a dielectrophoretic force on the particles thereby constraining motion of at least one particle; and

transporting at least the constrained particle along the ridge.

In a disclosed embodiment of the invention, particles are manipulated using dielectrophoresis. Sample fluid containing particles of interest is passed over an insulating ridge. See ¶73. Particles are constrained near an insulating ridge by the application of a non-uniform electric field. See ¶ 38, 73. Once the particles are constrained near the ridge, they are transported along the ridge. See ¶¶38, 73. Transport along the ridge may occur through any of a variety of transporting forces. See ¶ 48. Advantageously, then, using embodiments of the present invention, particles of interest may be separated from bulk fluid flow through dielectrophoretic forces. Once the particles of interest are separated, they are transported along a ridge designed to route those particles to an appropriate location. The system advantageously uses a system of insulating ridges, not electrodes, to shape the dielectrophoresis forces. This frees the system from constraints associated with electrode materials and fabrication. Furthermore, the system advantageously is able to move selected particles through a device while bulk fluid flows in the system.

The Examiner has cited Washizu (U.S. Patent Number 6,875,329). Washizu, however, discloses only electrodes having a "hollow space". See col. 7, line 66 – col. 8, line 22. The system is designed to concentrate, and hold, particles at these hollow spaces between electrodes. See col. 7, lines 7-22. Once particles are held at this location, they can be observed through the transparent bottom substrate. See col. 15, lines 27-57. Washizu also discloses grooves may be created in the vicinity of the vacant space. See generally cols. 16- 18 and Figs.

14-15. These grooves increase the space available to contain trapped particles. See col. 16, lines 60-61. Significantly, particles are not transported along the groove. Instead, particles are collected within the groove so there are a sufficient number to measure. Motion into or out of a hollow space, however, is not equivalent to motion along the ridge. Washizu's system simply concentrates particles near a vacant space, in order that they later be viewed. The particles are not moving through the system. In fact, Washizu is designed to hold particles in an area for observation and detection. If particles were in fact moving along grooves, the optical detectors of Washizu would be unable to accurately detect and measure them.

The Examiner has also cited Fuhr (U.S. Patent No. 6,749,736). Fuhr discloses electrode arrangements for dielectrophoretic manipulation. See abstract. Fuhr discloses a device with walls having apertures. See col. 14, lines 49-64 and Fig. 15. As particles move along the walls, they are drawn through the apertures according to their size and the electric field generated by nearby electrodes. The walls disclosed by Fuhr completely block the channel, they are what prevents the particles from moving laterally through device, except as dictated by the apertures and electric field. Fuhr does not disclose transporting a particle along a ridge that is capable of having fluid passed across it. Fluid cannot pass across the walls of Fuhr's device, because the walls block the motion of fluid across them. Fluid simply goes around the walls at the location of the apertures. If fluid were allowed to go across the wall of Fuhr's system, undesirable mixing of the particle sizes would occur.

Turning now to the claims, the patentably distinct differences between the cited references and the claim language will be specifically pointed out. Claim 19 recites "[a] method for manipulating particles using dielectrophoresis, the method comprising ... passing a sample fluid containing the particles across the insulating ridge ... and transporting at least the constrained particle along the ridge." As required by the language of claim 19, fluid must be passed across the ridge and a particle must be transported along the ridge. The cited references do not teach or suggest performing such acts and, in fact, teach away from the claimed invention. Claims depending from claim 19 are also allowable because they depend from an allowable base claim and further in view of the additional limitations recited in the dependent claims.

Respectfully submitted,

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